

Evaluation of “Quiet Sun” Trends in SSI Observations

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Determination of possible multi-decadal trends in solar spectral irradiance (SSI) is challenging. Activity levels during solar maximum vary significantly between cycles, so solar minimum observations must be compared to evaluate possible changes in “quiet Sun” irradiance. Any single instrument must have a sufficiently long lifetime (10+ years) and the appropriate phasing in order to observe two consecutive solar minima. The required long-term characterization accuracy needed to identify possible minimum-to-minimum changes that may be only 5-10% of solar cycle amplitude is stringent, particularly at wavelengths longward of ~300 nm. Assessment of possible quiet Sun SSI changes over two or more solar cycles requires the use of multiple instruments, which introduces the additional complexity of combining these data sets into a single composite product. We present results from individual instruments that have made SSI observations over two solar minima [NOAA-9 SBUV/2, SORCE SOLSTICE, SORCE SIM, Aura OMI], as well as results from the GSFCSO2 composite SSI data product that covers four solar minima.